MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: IV (Old)	**Term** : II	**Academic Year** :	2017-18
Course No.	: IDE 242			
Credits	: 3 (2+1)	**Title** : Irrigation Engineering		
Day & Date	: Wednesday, 02.05.2018	**Time** : 14.00 to 17.00	**Total Marks** :	80

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A"**.
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Describe Penman-Monteith method for estimating evapotranspiration with mathematical expression and notations.

b) A Persian wheel discharges at the rate of 11,000 liters per hour and works for eight hours each day. Estimate the area commanded by this water lift if the average depth of irrigation is 8 cm and irrigation interval is 15 days.

Q.2 a) State the adaptability and limitations of check basin irrigation method.

b) Furrows 90 m long and spaced 75 cm apart are irrigated by an initial furrow stream of 2 lps. The initial furrow stream reached the lower end of the field in 50 minutes. The size of the stream was then reduced to 0.5 lps. The cut back stream was continued for 1 hour. Estimate the average depth of irrigation.

Q.3 a) Classify different methods of irrigation and their sub groups.

b) An irrigation stream of 27 liters per second is diverted to a check basin of size 12 x 10 m. The field capacity of soil is 14 % while average moisture content of soil before irrigation is 6.5 %. Calculate the time for which water should be released to the check basin to bring the soil root zone of 1.20 m to the field capacity. Assume apparent specific capacity of soil equal to 1.50 gm/cc.

Q.4 a) Explain kinds of soil water in brief with its diagrammatic representation.

b) Explain soil moisture constants.

Q.5 a) Describe soil moisture characteristics curves for clay, loam and sandy soils with graphical representation.

b) Explain different types of irrigation efficiencies.

Q.6 a) Write in brief how irrigation is beneficial to agriculture. What are the harmful effects of excess irrigation?

b) Wheat crop requires 45 cm of irrigation water during 120 days irrigation period. How much land can be irrigated with a flow of 20 liters per second for 22 hours a day?

Q.7 a) Describe velocity- area method for measurement of irrigation water in brief and write in detail about current meter.

(P.T.O.)

b) An earthen channel has a grade of 0.10 per cent, depth of water 40 cm, bottom width 40 cm and side slopes 1.5: 1. Calculate the velocity of flow and carrying capacity of the channel. Take the value of 'n' as 0.025.

Q.8 a) Discuss in brief common troubles of underground pipelines.

b) Determine the discharge capacity of an underground concrete pipe line if diameter of pipe is 15 cm, length of pipe is 150 m and elevation difference between pump stand and outlet is 2 m. Assume value of f = 0.009.

Q.9 a) Enlist the equipments for land grading and field layout. State and describe the criteria for land leveling.

b) Explain the factors affecting infiltration rate.

Q.10　Write short notes

a) Furrow Irrigation method

b) Soil moisture depletion studies.

SECTION "B"

Q.11 a) Define the following terms.

1) Consumptive use	2) Net irrigation requirement
3) Seepage	4) Field capacity

b) State True or False

1) A current meter is a device used to measure velocity of flowing water.

2) The pore space in clay soil is lower than sandy soil.

3) Hydraulic radius is the ratio between the cross-sectional area of the stream and its wetted meter.

4) Recommended safe limits of land slopes in borders for clay to clay loam soil is 0.05% to 0.20%.

Q.12　Fill in the blanks

1) _____ is the process by which water vapors leaves from the living plant body and enters the atmosphere.

2) The moisture tension of a soil at the permanent wilting point ranges from _____ to _____ atmosphere.

3) The sheet of water which overflows a weir is called _____.

4) The useful limit of tensiometer is about _____ atmosphere.

5) _____ water is not available to plants.

6) 1 ha-cm = _____ m^3.

7) _____ plant is commonly used as the indicator for permanent wilting percentage.

8) The width of border usually varies from _____ to _____ meters.

✧ ✧ ✧ ✧ ✧ ✧ ✧ ✧ ✧